S'COOL BREEZE

Students' Cloud Observations On-Line

Volume 3, Issue 10 December 2004

What We Are Learning From Your Observations

By Dr. Lin Chambers, NASA Langley Research Center

Earlier this summer, a large amount of CERES data were finally processed, once a variety of algorithm and coding issues were resolved; and once computer power was available for the task. As a result, there are now over 9,000 cases in which we have student cloud observations from the ground at the same time and place as satellite observations. I have spent some time working on analysis of these correspondences, to see what we can learn.

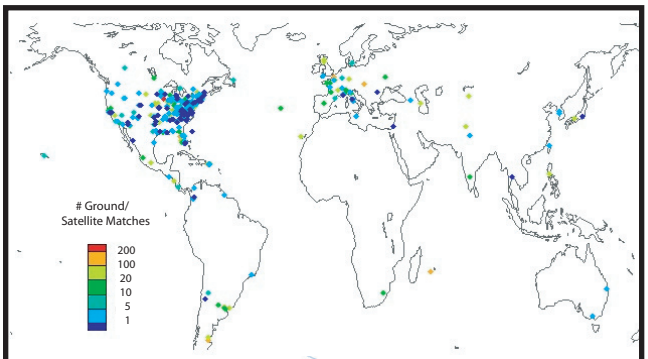

Fig. 1. Locations where S'COOL and CERES correspondences are available

Preliminary results of this study were reported in September at a meeting of the American Meteorological Society on Satellite Meteorology and Oceanography. I say preliminary, because I am continuing to investigate some of the information; and because there is much more that can be done. I summarize the findings here. You can also find the full report and the Powerpoint slides from my talk at http://asd-www.larc.nasa.gov/SCOOL/usedata.html.

Our analysis so far has been statistical: we look at all cases from any location together. Our hope is that you and your students will do some detailed analyses, looking only at the correspondences for your school or region. If you have correspondences, you should have received an email earlier this fall. You can also access the data on-line.

We have looked so far at agreement in cloud cover and in cloud layers. We find the agreement for cloud cover to be quite good, with more than half the cases having ground and satellite cover within the same

In this issue:

A Match Made in...Pennsylvania?

Waynesboro, Pennsylvania Teacher is #1 in Ground to Satellite Matches for S'COOL

By Katherine E Lorentz, SAIC - NASA Langley Research Center


*Todd Toth shares an '**observ**able' moment with some of his '**Match Makers!**'*

Since 1998, more than 1700 participants have submitted more than 33,000 cloud observations to the Students' Cloud Observations On-Line (S'COOL) project. Of these observations, there have been 9,172 ground to satellite matches, with 479 matches, or 5 percent, coming from one teacher's students. This teacher is Todd Toth from Waynesboro High School in Waynesboro, Pennsylvania.

"As a student I always liked doing research—labs and field courses always inspired me. S'COOL is one way I can share this enthusiasm with my students," said Toth. A 28-year teaching veteran, Toth definitely knows how to inspire students.

Toth first learned about S'COOL after being introduced to GLOBE by his Waynesboro High School principal who wanted to start a weather station at their school. With a lot of community support, the weather station became a reality and Toth began using GLOBE protocols to teach students about the weather station.

"I have been really lucky. The community is really behind us," said Toth whose students were able to compile weather forecasts using instruments supplied by local businesses. The local newspaper began running the students' daily weather report on the front page.

With the success of the weather station, Toth developed an Environmental Research course for juniors and seniors. The extra time and specialized subject matter of this course allowed him to employ S'COOL observations in addition to

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class. However, it is the disagreements that are most interesting. We have so far 154 cases where students report clear sky while the satellite reports overcast cloud; and 45 cases where the students report overcast while the satellite reports clear sky. These have been the focus of the initial analysis. We find that about a third of these cases may be due to spatial mismatch, in which we are comparing a different piece of the sky for the two observations. This happens because we are using a satellite product that is on a 1 by 1 degree lat/long grid. We also find some of these cases have incorrect Universal Time reported on the student observation (at least, I don't think you would let the students observe at 3 am!). Often this is due to not using a 24 hour clock, or to subtracting the UT offset when it should be added. We find NO evidence that snow on the ground is an issue in these cases, which is very good news.

In looking at cloud layers, the data continue to confirm our early finding that the satellite misses sparse cloud (0-5% cloud cover). Your observations will be very helpful in determining how often that occurs. We also find useful information when the ground is able to report a low overcast layer while the satellite sees only a thick cloud at a higher level.

I am currently looking at a comparison of cloud levels. The initial data contain an intriguing indication that the satellite reports very little high cloud by itself. Indications are that this is due to the scale of the satellite data (1 by 1 degree corresponds to ~100 km at the Equator). In future, we may try comparing with higher resolution satellite products to examine this issue further.

To summarize, your observations are providing some very useful information, and we hope that you will continue to observe and report when you can.

Going Through the LooPlans Lesson

The Non-Fiction Read-Aloud

by Dr. Lin Chambers; From a presentation by Kathy Mainz and Greg Smith

at the Iowa Science Teachers Section of the Iowa Academy of Sciences, Oct. 21, 2004

Objective: Students will gain science content knowledge by actively listening to an age-appropriate book or section read by their teacher or another child.

Type of Activity: Integration of science and literacy **Grade level:** K-8 at least

Materials: an age appropriate book; and materials for an age-appropriate activity

Background: As a scientist, I've always known that reading is integral to science. This presentation shared a concrete way to incorporate science content even if your teaching has to focus almost entirely on literacy.

Lesson activity:

1. Introduction: Make connections to curriculum concepts or earlier lessons (if you are studying the weather, you would relate the book to that)
2. Activate students' listening comprehension. For example, ask them to listen for the different kinds of weather that clouds bring.
3. Read the passage or book
4. Elicit responses from the students about the questions you raised in Item 2, and also any additional things they heard.
5. Conduct a student application activity on content. The presenters suggest borrowing existing ideas from AIMS, GEMS NSTA, etc, for the activities. Things like making models, doing experiments, playing with appropriate toys can all be short activities to go with the reading.

Complete Lesson Plans and some examples of this activity are available at: http://asd-www.larc.nasa.gov/SCOOL/lesson_plans/Read_aloud.html

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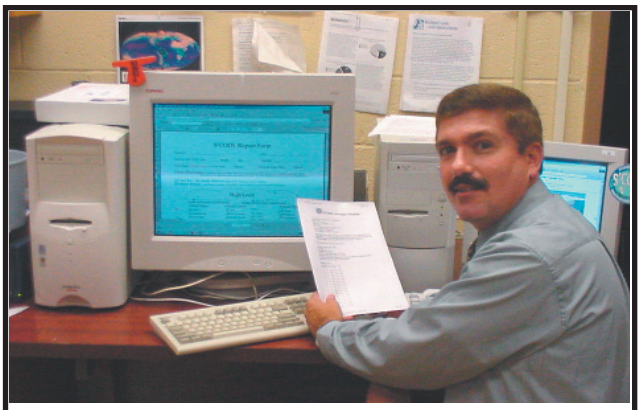
the GLOBE protocols.

S'COOL is a hands-on project based at Langley Research Center supporting NASA research on the Earth's climate. Students make basic weather and cloud observations at the exact time that a satellite passes over their location—these observations are called ground truth observations. The students' observations are then compared to the satellite data to help evaluate how well the satellite instrument and the scientific analysis methods are performing.

The GLOBE program, managed as a partnership between the University Corporation for Atmospheric Research (UCAR) and Colorado State University, Fort Collins, Colo., is an international student observation campaign. GLOBE brings together students, teachers, and scientists to support achievement in science, technology, engineering, and mathematics and to gather important data for the global Earth science community. NASA works with GLOBE to help achieve its mission of inspiring the next generation of Earth explorers.



Todd reflects on the impact S'COOL and GLOBE have had on his students' motivation and willingness to study meteorology.

Toth now uses S'COOL and GLOBE in all of his classes, including his ninth grade Earth and space science course. Using these programs in the classroom has been very rewarding for Toth. He has seen the students become very technologically savvy, and very enthusiastic to learn about Earth's atmosphere and climate. "They teach each other how to use the instruments and encourage the younger students to take my classes. There is almost always a waiting list to get into Environmental Research."

One of the biggest rewards is seeing his students go on to use what he has taught them. "A number of my students have gone on to study meteorology at Penn State. I even have one student who is serving in Iraq. She uses GPS technology and does the weather for her unit. She told me that she learned it all in my class. It is so great to see my kids achieving so much."

Quarter's Worth of Websites

Space Place Live: http://spaceplace.nasa.gov/en/kids/live

This is the third time we have highlighted the Space Place, and with good reason...they just keep coming up with great activities for students. Move over Oprah! Space Place hosts, Kate and Carlos, host their own talk show! Their guests are real scientists who work on really cool space and Earth missions. Join them and find out what it's like to work as a scientist, how they got started in science, and what they like to do for fun.

Visible Earth: http://visibleearth.nasa.gov/

This is a searchable directory of images, visualizations, and animations of the Earth. Some of the searchable indexes include: Agriculture, Atmosphere, Hydrosphere, Land Surface, Oceans, Radiance, Solid Earth, Locations and Satellites/Sensors. The purpose of Visible Earth is to provide a consistently updated, central point of access to the superset of NASA's Earth science-related media. These images are considered public domain and can be reproduced and reused by educators and students.

DLESE- Digital Library of Earth System Education: http://www.dlese.org

DLESE is a free service for finding valuable online resources for teaching and learning about the Earth. DLESE ensures that the resources are available and relevant to the Earth system. Many of the resources in DLESE have undergone an extra level of scrutiny, to make certain that they are scientifically accurate, grade-level appropriate and effective for teaching.

NASA STEMS

NASA Science Trivia to Excite & Motivate Students

It all came down to this...the main event...NASA's biggest moment! The Apollo 11 mission of 1969 is well know for the historic words, "That's one small step for man, one giant leap for mankind." With these words, commander Neil Armstrong began his moonwalk which left behind the famous boot-shaped depression in the gray moondust, whose picture has been seen by millions of people. Now you have probably already quessed that the Apollo space program was named after the Greek god of the Sun, but did you know that a cutting-edge science experiment left behind in ithe Sea of Tranquility by Apollo 11 astronauts is still running today? That's right, it called a 'lunar laser ranging retroreflector array.' It is a device being used today to measure the exact Earth-Moon distance. To learn more about this on-going experiment and to see more pictures visit this Science@NASA website:
http://science.nasa.gov/headlines/y2004/21jul_llr.htm?list763783

Teacher Corner

Over 1775 participants are now registered. Keep spreading the word!

Have you changed your school information?
Please remember to notify us of any changes in your school information or e-mail address.

NEW STUDENT RESOURCE!

The S'COOL Electronic-Postcard

Choose from many designs and send a picturesque postcard to a friend to brighten his or her day.
http://asd-www.larc.nasa.gov/SCOOL/postcards.html

INTENSIVE OBSERVATION PERIOD – IOP
January 17-21

Thank you for your continuted participation!

NASA Langley Research Center
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UPCOMING EVENTS

ESIP Federation Meeting
January 4-6, 2004
Washington, DC, USA

Society for Amateur Scientists Convention
January 13-16, 2004
Las Vegas, Nevada, USA

Utah Science Teachers Association Conference
February 18-19, 2004
Layton, Utah, USA

Georgia Science Teachers Association Conference
February 17-19, 2004
Columbus, Georgia, USA

http://asd-www.larc.nasa.gov/SCOOL/visits.html

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Roberto Sepulveda, Spanish translator

An Elementary Perspective!

"My 4th graders are shocked that they didn't come in 1st for the top 10 in October! They're so funny! They've been taking hourly observations, even on the weekends. They're so motivated by the top 10 list! Because they came in 2nd, they're saying they want to take observations every 20 minutes!!! I told them we have to do other school work some of the time. They're so proud of their work with NASA. This project is so wonderful. This is my 5th year being involved and I just love it."

Karen O'Shaughnessy, Jewett Street School, Manchester, New Hampshire, USA